

**Baselines - Budget and Scheduling Plan**

Task Name	Start	End	Duration
Engineering	10/1/00	10/1/00	1 day
Design	10/1/00	10/1/00	1 day
Analysis	10/1/00	10/1/00	1 day
Programming	10/1/00	10/1/00	1 day
Equipment, Software Tools	10/1/00	10/1/00	1 day
Implementation	10/1/00	10/1/00	1 day
Evaluation	10/1/00	10/1/00	1 day
Testing	10/1/00	10/1/00	1 day



South Dakota  
Science and Technology  
Authority

**Homestake Mining  
Company**

**Administration Building**  
**630 East Summit Street**



# The Safety Program is in Transition -

- From MSHA jurisdiction for Homestake Mining Co.
- To OSHA jurisdiction for the scientific laboratory construction and operations
- Work-in-progress to develop an Integrated Safety Management program for:
  - Underground construction and maintenance
  - Underground experimental equipment and research activities
  - Surface operations
  - Safety management, oversight, and training

# Safety Vision:

Every person going home safe and healthy every day

## Implementation:

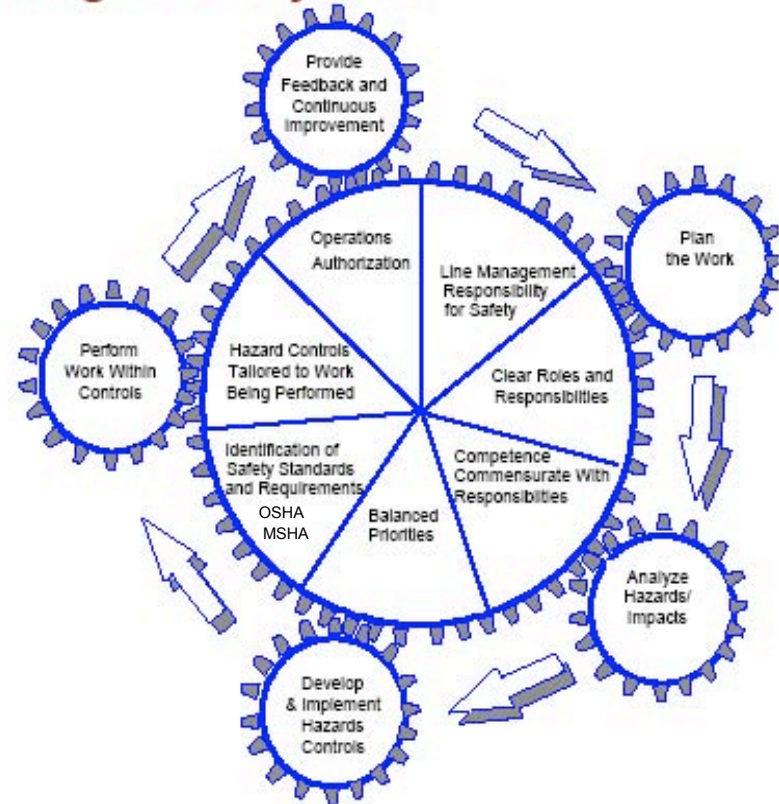
- Integrated Safety Management (ISM) Safety Program will be tailored to needs of site:
  - User-friendly
  - Access control
  - Underground hazards mitigation
  - Experimental hazards mitigation (cryogenics, large-volume liquids, chemical hazards, compressed gases, electrical, biological, mechanical, radiation, vacuum, lasers)
- Safety Director will develop the ISM program with assistance from LBNL EH&S staff, ISM Oversight Committee, and scientific collaborators
- Key component: Safety Director will establish a review and evaluation process for all research proposals:
  - Prior to arrival researcher must complete hazards questionnaire (i.e., cryogenics, compressed gas, chemicals, biohazards, electrical, radiation, vacuum, laser, etc)
  - Consulting with researcher, Safety Director determines controls (engineering, administrative, personal protective equipment) and training
  - Researcher may complete most training online
  - On the Job Training completed before researcher enters underground facility

# Integrated Safety Management

I am responsible for safety.

- What will I be doing?
- Do I know what the hazards are?
- Do I have everything I need to do the job safely: training, tools, time, and authorization?
- Am I doing the job safely?
- What can we do better?

## *The Integrated Safety Management System*



# Models for Homestake DUSEL ISM

- Advanced Light Source – user facility
- Yucca Mountain – underground facility with hazardous materials
- WIPP – underground facility with hazardous materials
- NuMI and associated experiments - underground physics research facility
- Mining Industry – underground construction and operations
- Homestake Mining Company & SDSTA – site-specific procedures for underground construction and operations



South Dakota  
Science & Technology Authority



# Primary Activities during DUSEL Pre-construction Planning & Development in 2007 - 2010

- Expand and Integrate ISM with the existing safety programs at Homestake
- Develop procedures and controls for specific hazards
- Develop system to generate and review Activity Hazard Documents (AHD) for experiments
- Integrate ISM with DUSEL Project Continuous Risk Management process

# Existing Elements of the SDSTA Safety Program for Mining-to-Labs Conversion

## For Re-entry in 2007:

- Safety Manual
- Hazards Analyses
- Job Safety Analyses
- Standard Operating Procedures
- Safety Checklists
- Training Program

**SAFETY MANUAL - draft**  
SOUTH DAKOTA SCIENCE & TECHNOLOGY AUTHORITY  
Section 09 - Safety Guidelines  
TABLE OF CONTENTS

SAFETY POLICY	.....
WHAT TO DO IN CASE OF A SERIOUS ACCIDENT OR FIRE	.....
LOCK OUT-TAG OUT PROCEDURE	.....
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FIRE PREVENTION	.....
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**SAFETY MANUAL - draft**  
SOUTH DAKOTA SCIENCE & TECHNOLOGY AUTHORITY

**HOIST AND SHAFT GUIDELINES BOOK**

South Dakota Science & Technology Authority

South Dakota Science & Technology Authority

**EMERGENCY RESPONSE  
CRISIS COMMUNICATIONS PLAN**

LEAD, SOUTH DAKOTA

2007

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# **SDSTA Safety Program includes the following Primary Elements**

- **Five Point Safety System with Field Level Risk Assessment**
- **Communications - Safety Meetings**
- **Occupational EH&S Committees**
- **Planned Inspection Program**
- **Job Task Analysis & Procedures**
- **Job Observations**
- **Safety Audits and Program Measurement**
- **Training and Education**
- **Incident Investigation**
- **Security**



# SDSTA Safety System Hazards Analysis Example

## Example: SDSTA - Mine Reentry Review of Potential Hazards

### GENERAL SAFETY PLAN & INSPECTION PROCEDURES:

- Review maps and photos and safety plan for each level prior to inspections and cleanup/closure records as needed and listed by index number.
- Emergency response team at the ready including SCBAs.
- Contingency supplies at the ready for hazards associated water, ground, fire, and ventilation needs.
- Inspection Team (2 shifts)
- Underground team: 4 to rotate duties:
  - Gas & air checks & other sampling as required.
  - Ground conditions (barring down)
  - Documentation and safety officer
  - Cager to remain at the level until 3 person inspection team returns.
- Surface team:
  - Surface attendant for constant communication
  - Rescue team on standby on surface.
  - Hoist operator (s).
- Security system with badges and tag-in/tag-out for underground to be followed.
- Communicate before exiting cage; establish an estimated time from departure to return. Communicate with surface team immediately upon return.
- Use 5-point safety system along with field level risk assessments.
- Gas testing continuously (oxygen, carbon monoxide, hydrogen sulfide, lower explosive limit and others as needed) using multigas tester.
- Air flow using anemometer, air temperature and humidity. Use smoke tubes to indicate flow visually as well. Do not travel if temperature and humidity heat index is too high.
- Other sampling (water, rock/dirt) as required. Coordinate with scientific agenda and procedures.
- Infrastructure condition (steel, timber, station plates, pipe, etc.)
- Treat all electrical lines and systems as "hot" unless confirmed, locked and tagged out.
- Air doors and stoppings install as indicated prior to continuing inspections.
- Water flows including direction and estimated flow rates.
- Sources of water may include but not limited to: ore passes, chute raises, old stopes and associated walls, sumps, drain holes, water ditches, diamond drill holes or other mining holes, and low spots along travelways,
- Drain holes and pipe conditions and check pump rooms including intake screens.
- Fall protection per policy prior to crossing any dump, screen, or open hole. Stay at least 6 feet away from all shaft station doors and gates. Those areas will be inspected from the shaft side.

# SDSTA Safety System

## Job Safety Analysis Example

### **EXAMPLE: Ross Hoist Operation - JSA for Ore Hoist MG Set Start**

Title of Job/Operation: Ross Ore Hoist Motor Generator Set Starting		Date: 03/22/07 (review 04/06/07)	No. 0001
Position/Title(s) of Person(s) doing Job: Hoist Operator (Contractor working for Regan Services)			
Name of Employee Observed: Bill Denke (former Homestake Hoist Operator task trained)		Analysis Made By: Greg King	
Department: N/A		Section: N/A	
Analysis Approved By: Greg King and Tom Regan review		Reference Safety Manual Hoist Operator Guide Book NOTE: MSHA inspected and approved job steps in prior year inspections	
Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures	
01. Check Motor Brushes (AC Motor)	Electrical arc flash potential	Electrician clean and check brushes prior to.	
02. Start Hoist Lube System	Oil could overflow	Make sure valves are in correct position (verify)	
03. Start Hydraulic Brake System	Electrical arc flash potential	Correct body position and location	
04. Start Lube Cooler System	Electrical exposure potential	Correct body position and location	
05. Start Oil Lift Pumps	Oil could overflow	Make sure valves are in correct position (verify)	
06. Pull down and latch Slip Regulator	Strains and Pinch Points	Ergonomic and pinch point considerations	
07. Start the Motor Generator Set	Electrical arc flash potential & Rotating Equip.	Correct body position, no loose clothing, guards	
08. Check all Oil Rings (visual)	Rotating Equipment	Correct body position, no loose clothing, guards	
09. Adjust Slip Regulator	Strains and Pinch Points	Ergonomic and pinch point considerations	
10. Shut off Lift Pump & Put in Breaker	Electrical arc flash potential	Correct body position and location	
10. Shut off Lift Pump & Put in Breaker	Electrical arc flash potential	Correct body position and location	
11. General: walking and moving around moving equipment & other risk management.	Slips, trips, falls & being struck by or caught in.	Good housekeeping, dry walkways, guarding, Field Level Risk Assessments and use of 5 point Safety.	

# SDSTA Safety System Standard Operating Procedures

## **SAFETY MANUAL GUIDELINES** **TABLE OF CONTENTS**

- WHAT TO DO IN CASE OF A SERIOUS ACCIDENT OR FIRE
- LOCK OUT/TAG OUT PROCEDURE
- GROUND CONTROL
- FIRE PREVENTION GUIDELINES FOR LARGE AND SMALL
- COMBUSTIBLE LIQUID STORAGE UNDERGROUND
- GUIDELINES FOR USE OF OXYGEN/ACETYLENE BURNER & GENERAL WELDING
- EXPLOSIVES & Explosive Loading
- DRILLING
- VENTILATION
- LOADING, HAULING, DUMPING AND CRANE OPERATION
- MINE LAMP SIGNALING SYSTEM
- TRAVELWAYS AND ESCAPEWAYS \_ Surface and Underground
- COMPRESSED AIR AND BOILERS
- USE OF EQUIPMENT
- WIRE ROPE CLIPS
- PERSONAL PROTECTION
- MATERIALS AND EQUIPMENT STORAGE AND HANDLING
- SIGN PROCEDURE
- PERSONNEL AND MATERIALS HOISTING
- MISCELLANEOUS
- IMPORTANT NOTICE TO EMPLOYEES

# SDSTA Safety System

## Safety Checklists - Examples

- Abrasive Wheel Equipment
- Compressor Air Receivers
- Compressed Gas Safety
- Compressors
- Confined Spaces (PDF)
- Control of Harmful Substances by Ventilation
- Electrical Safety
- Elevated Surfaces
- Emergency Response
- Ergonomics
- Fall Prevention
- Fire Protection
- Flammable and Combustible Materials
- Floor and Wall Openings
- Forklift Safety
- Fueling
- General Work Environment
- Hand Tools and Equipment
- Hazard Communication
- Hazardous Chemical Exposure
- Hazardous Substances Communication
- Lock-Out/Tag-Out
- Machine Guarding
- Material Handling and Storage
- Medical Services and First
- Means of Egress
- Noise
- PPE Job Hazard Analysis
- Portable Ladders
- Portable Powered Tools
- Powder -Actuated Tools
- Recordkeeping
- Respiratory Protection
- Safety and Health Program
- Sanitizing Equipment and Clothing
- Spraying Operations
- Stairs and Stairways
- Tire Inflation
- Transporting Personnel
- Walkways
- Welding

# SDSTA Safety Training Program

## **Training Requirements:**

- Surface-work Training – On-Site, Standard Course
- Underground-work Training – On-Site, Standard Course
- Annual Refresher Training
- Site-specific and Hazard-specific Training
- Job Task Training and Evaluations

## **Various methods of training will include:**

- Training at the site
- Remote via internet (OSHA, MSHA, NIOSH)
- Tailored to meet the needs of employees, contractors, users, students and educators, visitors and guests

# Local and Regional Resources for Emergency Response

## **SDSTA participates with membership in the Local Emergency Planning Committee.**

- Medical emergency response network is in place including:
  - On-site First Aid/First Responders, CPR, AED trained staff
  - Local clinic, 24 hr. emergency room & hospital in Deadwood (3 miles)
  - Full comprehensive medical, diagnostic and surgical services at trauma center in Rapid City (45 miles).
  - Life-flight from Lead to Rapid City trauma center with ~ 20 minute flight.
  - Alternative trauma centers with 1-1/2 hr. flights (at Denver and Minneapolis)
- Lawrence County Emergency Management, Sheriff, and Search and Rescue in Deadwood (3 miles)
- Lead and Deadwood Fire Departments
- Pandemic Response Plan (local)
- Point of Distribution for Homeland Security (15 miles)
- Lead *Firewise* wild-land fire mitigation team (local)
- National Incident Management System, Local Incident Command System
- Explosives Ordinance Disposal and HAZMAT teams at Ellsworth Air Force Base (50 miles)
- South Dakota National Guard (SDNG) Joint Head Quarters in Rapid City(45 miles)



# Safety Management

- Vision - Every person going home safe and healthy every day
- Strong safety culture from Homestake operations
- Integrate research safety into existing safety program
- Build upon ISM model programs

## Supplemental Slides

# SDSTA – Safety Vision

*The fundamental vision for Homestake DUSEL is every person going home safe and healthy every day.*

## PRIORITIES

- *People*
- *Environment*
- *Property*
- *Processes for Science and Technology*

***ZERO incidents is priority one;  
there is no other alternative to achieving the vision.***

# Safety System includes the following primary elements

## Induction/Orientation Program Policy

Training and education for specific tasks or job descriptions are required for all employees, contractors, consultants, visitors, and vendors.

The level and scope will vary to the degree and content as required based on risk assessments and length of time work will be performed for South Dakota Science and Technology (SDSTA).

# **Safety System includes the following primary elements**

## **Five Point Safety System with Field Level Risk Assessment**

- Ensure personnel improve and increase safety awareness.
- Train personnel in the correct methods of inspecting, recording, and maintaining a safe work environment.

**Point 1 – Can I work safely? Will I continue to work safely?**

**Point 2 – Are entrances and travelways in proper condition?**

**Point 3 – Are the workplace and equipment in proper condition?**

**Point 4 – Is work being done safely and according to standards?**

**Point 5 – Did you witness/perform an Act of Safety?**

# **Safety System includes the following primary elements**

## **Incident Investigation**

It is essential that all incidents which result in, or have the potential to result in, employee injuries, illness, property and equipment damage, or loss to process be promptly reported.

Site management will be well trained in incident investigation and strive to ensure that investigations are done in a timely and efficient manner. All reports are reviewed by senior management with prevention in mind.



# **Safety System includes the following primary elements**

## **Communications Group Safety Meetings**

In order to ensure effective communication of related safety topics and to provide an opportunity to directly participate in safety programs, weekly group safety meetings are required.

In addition daily health and safety reviews will be conducted by all entities.

# **Safety System includes the following primary elements**

## **Occupational Health & Safety Committees:**

A Health & Safety Committee will be established. This committee will perform monthly work place inspections, identify hazards in the workplace and insure corrective actions have been taken.

# **Safety System includes the following primary elements**

## **Planned Inspection Program:**

Management teams will ensure that every effort is taken to identify and correct any substandard practices and/or conditions that exist in a workplace through the implementation of a planned inspection program.

## **Safety System includes the following primary elements**

### **Job Task Analysis & Procedures:**

Management will ensure that all critical tasks on any project are identified and analyzed, and that job procedures are written and updated in a timely manner. These procedures are periodically reviewed with all crews at group safety meetings.

# **Safety System includes the following primary elements**

## **Job Observations:**

A job observation is an action whereby a supervisor performs an observation of an employee performing a certain job task and documents the level of compliance to the specific job procedure. This is an effective tool in determining if an employee fully understands the various steps in performing a task.

# Safety System includes the following primary elements

## **System Engineering and Failsafe Design:**

Prior to beginning a new, unusual or non-routine task, management will take every reasonable precaution to protect its workers and clients from the occurrence of incidents through the use of system engineering and failsafe design.

This incorporates development of specific procedures to perform tasks that minimize the risk of injury to employees. These procedures are developed jointly with management and hourly employees.



# **Safety System includes the following primary elements**

## **Safety Audits and Program Measurement:**

Safety program measurement is essential in achieving success in accident prevention on projects. Management conducts a minimum of one safety audit per project per year.

The audit is performed by the Laboratory Safety Director and a team of impartial auditors who are selected to assist in the process.

# Safety System includes the following primary elements

## **Training and Education:**

To ensure the health and safety of employees through the continuous process of safety and skill training, Management will provide all relevant training according to state and federal regulations as well as training required by site-specific internal standards.

This shall include training in the following areas: First Aid & CPR, Common Core training for underground construction workers and supervisors, Ground Control and management training courses, laboratory and specific science safety and health training.

# Safety System includes the following primary elements

## ***Integrated Safety Management***

The ISM Plan will include responsibilities, oversight, and enforcement of policies and procedures for life cycle activities, risks, and costs.

The objective of Integrated Safety Management (ISM) is to implement safe practice as a core value and integral part of DUSEL mission accomplishment.

The ISM program encompasses all aspects of environment, health and safety with the primary goal of making EH&S protection an inherent part of all activities associated with the development and operation of Homestake DUSEL, thereby creating and maintaining a work environment that is free of work-related accidents, injuries, illnesses, or environmental releases.

# SDSTA - Mine Reentry Planning

## Level by level review of potential hazards

### **GENERAL SAFETY PLAN & INSPECTION PROCEDURES:**

- Review maps and photos and safety plan for each level prior to inspections and cleanup/closure records as needed and listed by index number.
- Emergency response team at the ready including SCBAs.
- Contingency supplies at the ready for hazards associated water, ground, fire, and ventilation needs.
- Inspection Team (2 shifts)
- Underground team: 4 to rotate duties:
  - Gas & air checks & other sampling as required.
  - Ground conditions (barring down)
  - Documentation and safety officer
  - Cager to remain at the level until 3 person inspection team returns.
- Surface team:
  - Surface attendant for constant communication
  - Rescue team on standby on surface.
  - Hoist operator (s).

# SDSTA - Mine Reentry Planning

## Level by level review of potential hazards

### **GENERAL SAFETY PLAN & INSPECTION PROCEDURES:**

- Security system with badges and tag-in/tag-out for underground to be followed.
- Communicate before exiting cage; establish an estimated time from departure to return. Communicate with surface team immediately upon return.
- Use 5-point safety system along with field level risk assessments.
- Gas testing continuously (oxygen, carbon monoxide, hydrogen sulfide, lower explosive limit and others as needed) using multigas tester.
- Air flow using anemometer, air temperature and humidity. Use smoke tubes to indicate flow visually as well. Do not travel if temperature and humidity heat index is too high.
- Other sampling (water, rock/dirt) as required. Coordinate with scientific agenda and procedures.
- Infrastructure condition (steel, timber, station plates, pipe, etc.)
- Treat all electrical lines and systems as "hot" unless confirmed, locked and tagged out.
- Air doors and stoppings install as indicated prior to continuing inspections.
- Water flows including direction and estimated flow rates.
- Sources of water may include but not limited to: ore passes, chute raises, old stopes and associated walls, sumps, drain holes, water ditches, diamond drill holes or other mining holes, and low spots along travelways,
- Drain holes and pipe conditions and check pump rooms including intake screens.
- Fall protection per policy prior to crossing any dump, screen, or open hole. Stay at least 6 feet away from all shaft station doors and gates. Those areas

# SDSTA - Mine Reentry Planning

## Level by level review of potential hazards

### **GENERAL SAFETY PLAN & INSPECTION PROCEDURES:**

- will be inspected from the shaft side.
- Old electrical, pipe, and hangers. Danger of failure may be evident.
- Wall conditions
- Dumps and ore passes - measure for any possible water buildup and depth.
- Never go past second intersection or below water built up.
- Never travel through water that is knee deep or deeper.
- Drainage from bulkheads to the shaft drainage system will be completed as needed prior to proceeding to the next area of inspection.
- Photograph digitally as entry proceeds (you can not take too many photos). Document photo number, location, and what is being viewed.
- PPE: Level D clothing, arm guards, steel toed boots for wet conditions, hard hat with chin strap optional, safety glasses with side shields optional, reflective stripes or vests, mine lamps, gloves for barring and other tasks as assigned, self-rescuers (2 per person), water, snack food, emergency kit with food, water, blankets, extra lights, first aid kits), refuge chambers at the ready, communication equipment at the ready.

### **Typical daily shift plan (to be adjusted as needed):**

- Briefing
- Inspections
- Debriefing
- Work plan for any repairs, contingencies, or safety requirements
- Crew sizes adjusted to provide multiple tasking in order to meet schedules.



# SDSTA - Mine Reentry Planning

## Level by level review of potential hazards

### **GENERAL SAFETY PLAN & INSPECTION PROCEDURES:**

Example of typical narrative directions for an underground level inspection.  
Included with narrative is a map from the reclamation project during closure.

#### **1700 foot level**

- Ross station, dumps, ore raises
- Stairway wall
- Old Abe raise - Danger open hole
- Ellison corners - check walls and water at by-pass drift and old station
- Check drift toward open hole near Ellison. Danger open hole & muddy area.
- #2 Air raise - check & measure for water down raise
- Yates header and doors
- Yates station and dumps and ore raises for water
- Check to 7L and block air door.
- Check to 9L and block air door. (brace substantially to default water to ramps.
- ENSURE WATER CAN NOT GET TO THE ROSS OR YATES
- Construct temporary bulkhead at Ross

# Safety Guidelines & Procedures

## **SAFETY POLICY**

- PEOPLE are the most important assets of SDSTA and the protection of ALL will take precedence over all other considerations. Management is committed to providing the training, support, and equipment needed to ensure a safe, healthy work environment. We also believe that every employee must take the responsibility to work safely, ensure the safety of others, and to protect property and equipment.
- Each employee must comply with the standards of SDSTAs health and safety program and will be held accountable for performance in compliance with these standards. The supervisor is primarily responsible for ensuring work site compliance, but all levels share the responsibility for compliance with overall health and safety standards.
- The protection of assets, other than people, is also an important part of our loss control efforts. Management will ensure the protection of people, property, equipment, and facilities. To this end, fire protection systems and security arrangements are provided. All employees and contractors and sub-contractors are expected to comply with security requirements and ensure the proper working condition of fire protection systems in their work areas.

# Integration of LBNL Safety Manual

It is the policy of the Ernest Orlando Lawrence Berkeley National Laboratory to provide a safe and healthful working environment for its employees, participating visitors, and other visitors; to prevent any harm to the health and safety of the general public or to the environment as a result of the Laboratory's activities; and to protect its property from damage or loss due to accidents or other causes.

Berkeley Lab employees, contractors, and casual and participating visitors at the Lab or its off-site locations are required to be familiar with and observe Lab safety (Work Smart) standards. The Berkeley Lab articulates this policy through its Integrated Environment, Safety and Health (ES&H) Management Plan.

# Integration of LBNL Safety Manual

Lawrence Berkeley National Laboratory  
University of California  
Berkeley, California 94720

**HEALTH AND SAFETY MANUAL IS INTEGRATED WITH SDSTA SAFETY MANUAL**

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  - 5.1 [Accident Investigation and Reporting](#)
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# Integration of LBNL Safety Manual

**HEALTH AND SAFETY MANUAL IS INTEGRATED WITH SDSTA SAFETY MANUAL**

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# SDSTA – Safety SUMMARY

*The fundamental vision for Homestake DUSEL is every person going home safe and healthy every day.*

## PRIORITIES

- *People*
- *Environment*
- *Property*
- *Processes for Science and Technology*

*With the integration of BEST PRACTICES from the historical Homestake Experience, Regulatory Standards, and LBNL, we have created world class safety manuals, procedures, and practices for the safety and health of all those involved in the creation of the Homestake Interim Laboratory and ultimately the Deep Underground Science and Engineering Laboratories.*